Lower Duwamish Waterway Stakeholders Meeting

April 24, 2019

Community Involvement Updates

Upcoming Events

- Duwamish Roundtable
  - Wednesday, May 29 6-8 PM

    Youngstown Cultural Arts Center (Delridge neighborhood)

- Boeing Plant 2
  - public comment period on Corrective Measures Study / Statement of Basis
  - *early summer*

EPA: Cleanup of the LDW

Pre-Design Studies - Data Evaluation Report

Data reports approved, posted on LDWG.org

Data loaded in EIM

Results of baseline sampling summarized at November Stakeholder meeting.

Draft Data Evaluation Report was submitted to EPA 12/17/2019.

EPA comments on the document pending

- Despite sample compositing, high variability for some results
- potential refinements to sampling approach
- analysis of cPAHs in archived clam tissue - ongoing

Upper Reach RD – River Mile 3 to 5

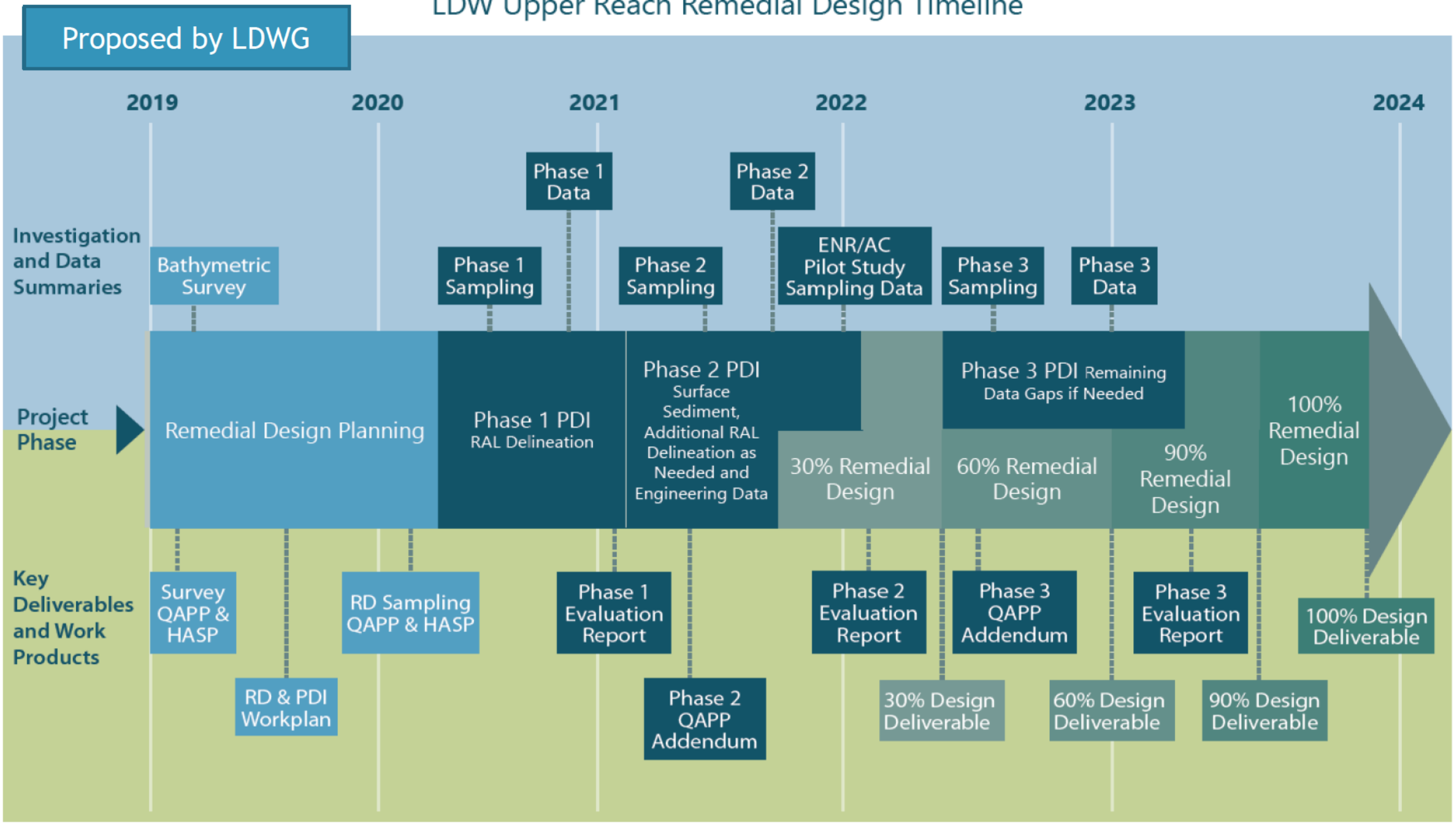
- LDWG contractors selected - Anchor QEA (engineering) and Windward (sampling).
- Notice to Proceed February 14, 2019 - Triggers enforceable dates.
- First deliverables June 14, 2019 - Remedial Design Work Plan and Pre-Design Investigation Work Plan.
- Pre-Design Investigation to refine areas for application of remedial technologies by sampling.
- Goal - first round of sampling in spring 2020 - daytime low tides.
- Expect a second round of PDI sampling to follow.
- Bathymetry update is underway, based on April survey in Upper Reach.

Upper Reach Remedial Design Draft Schedule

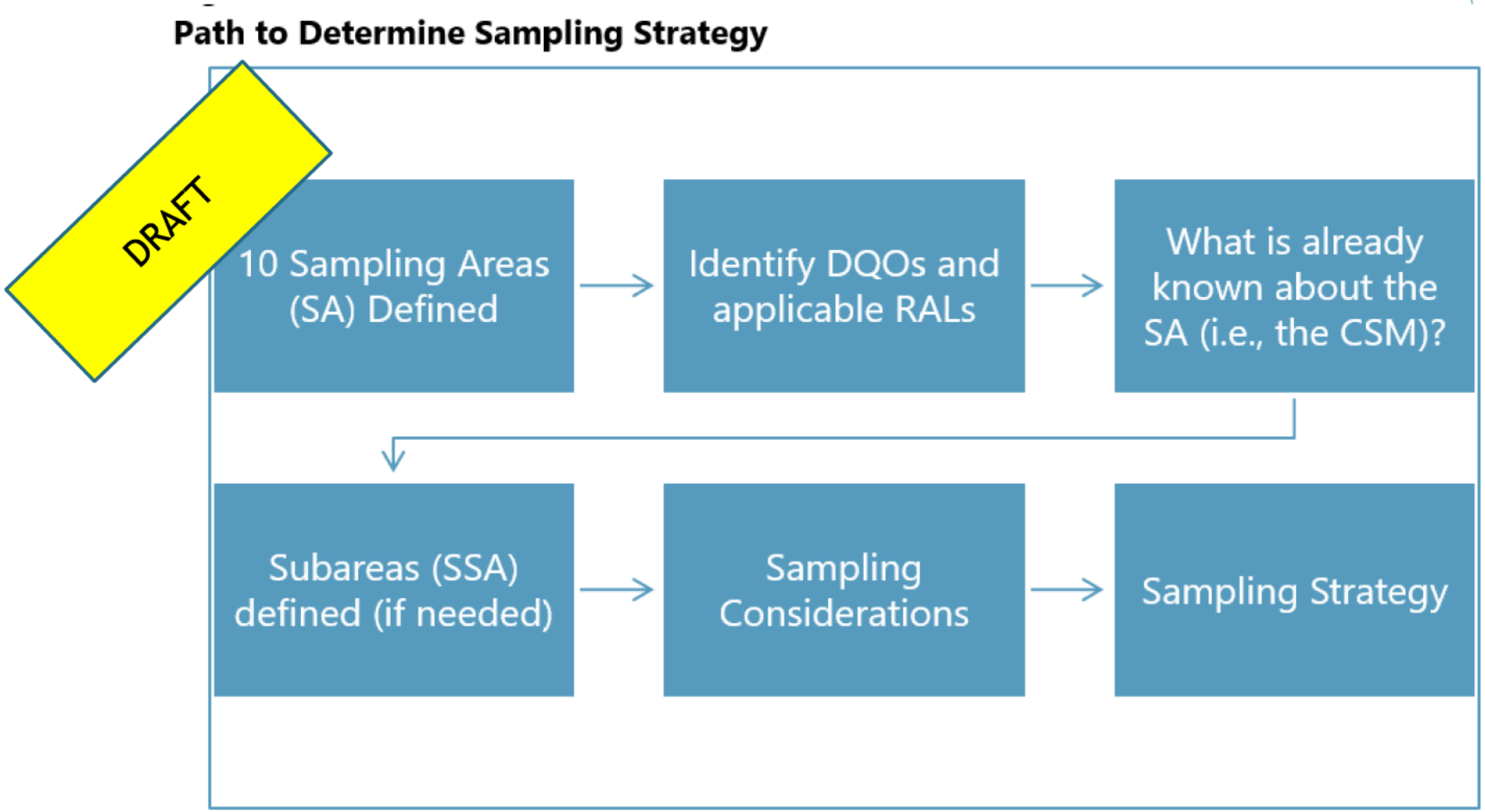
Current estimate:

- Two phases of spring field work - 2020, 2021
- Tiered analyses - to refine areas
- 100% design by August 2024?
- Actual schedule may differ - review times, revision times

LDW Upper Reach Remedial Design Timeline



Conceptual Pre-Design Investigation Work Plan for Upper Reach



Starting point:
Lots of data
Recovery Categories
RAL application
depths/areas

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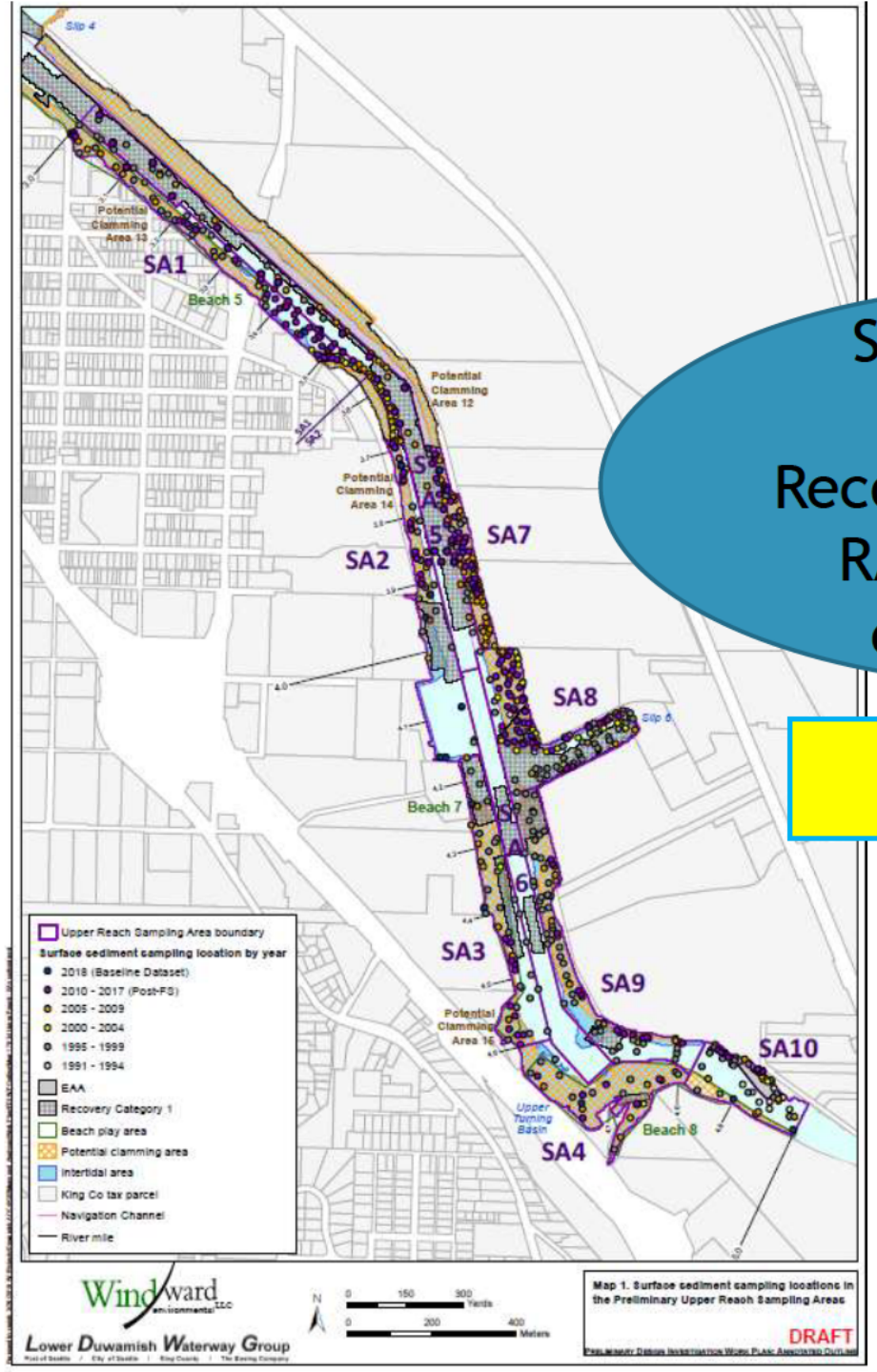
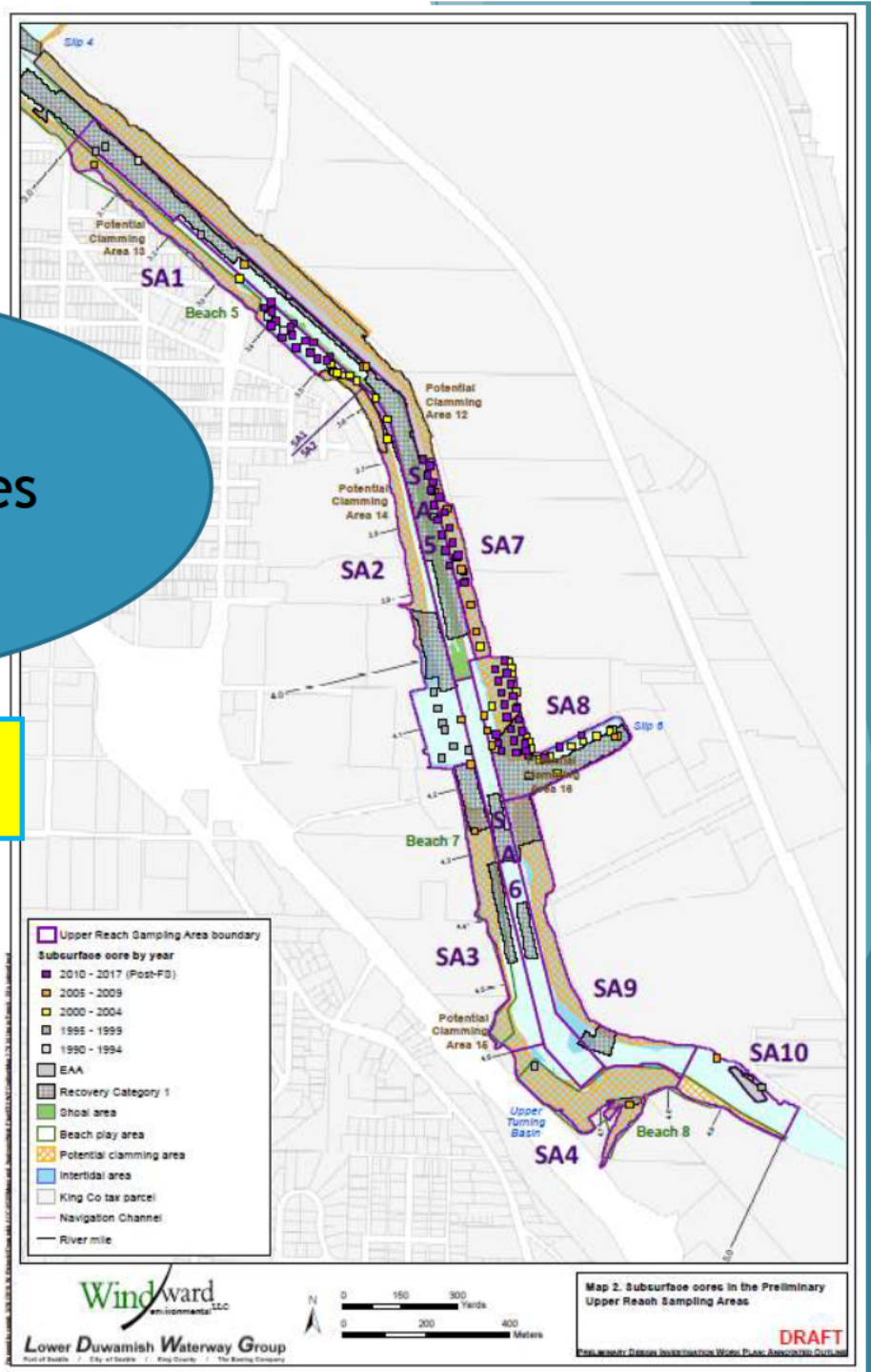


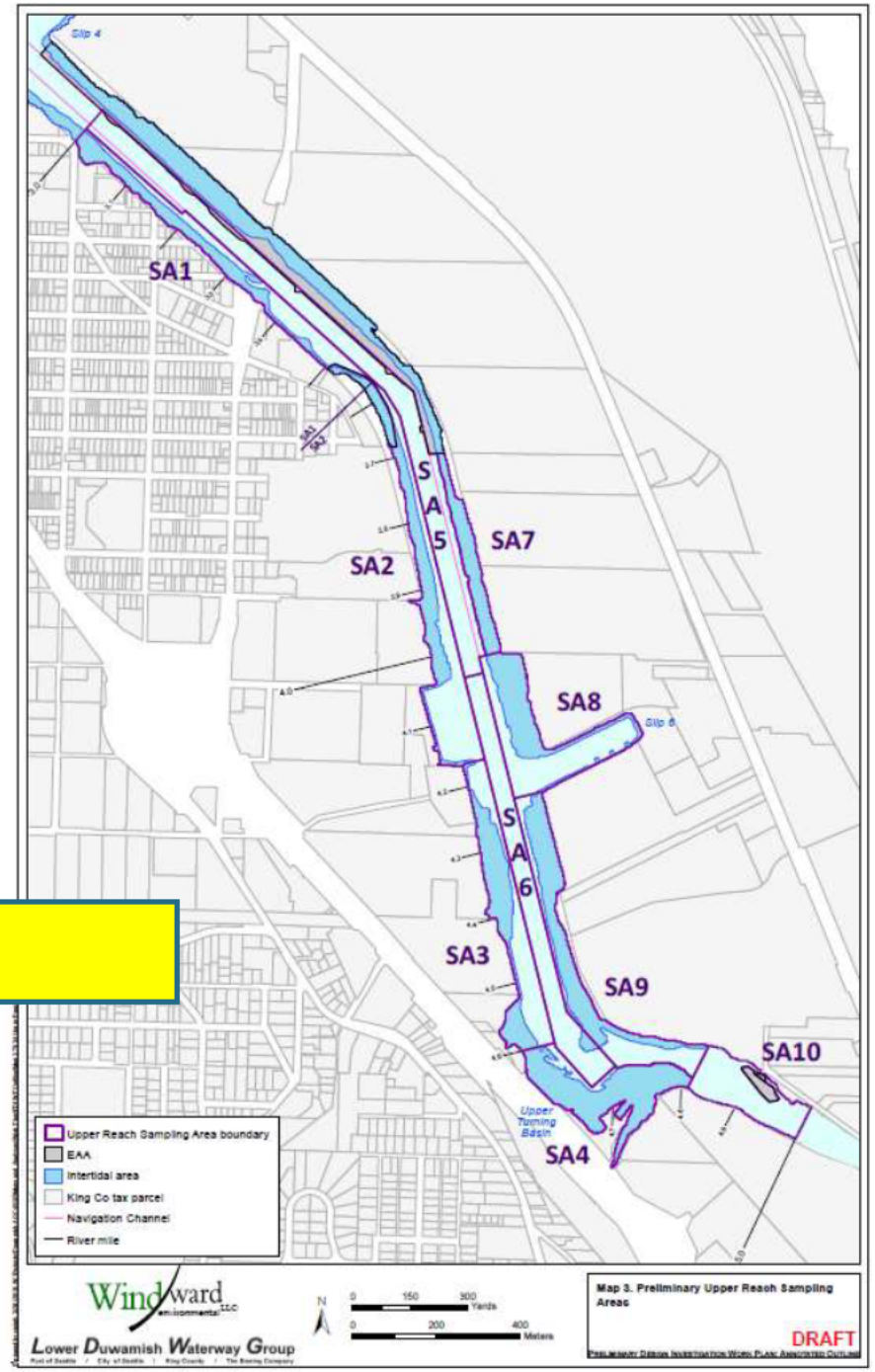


LDW Preliminary Approach: Upper Reach Sub-Areas for Design

Sampling will consider:

- Subtidal versus intertidal
- Navigation channel
- Recovery Category 1, 2, or 3
- Phased field effort, tiered analyses
- Early Action Areas not included

DRAFT



Change in IRIS toxicity value for benzo(a)pyrene

Effect on Lower Duwamish Waterway?

IRIS Toxicity Value for benzo(a)pyrene

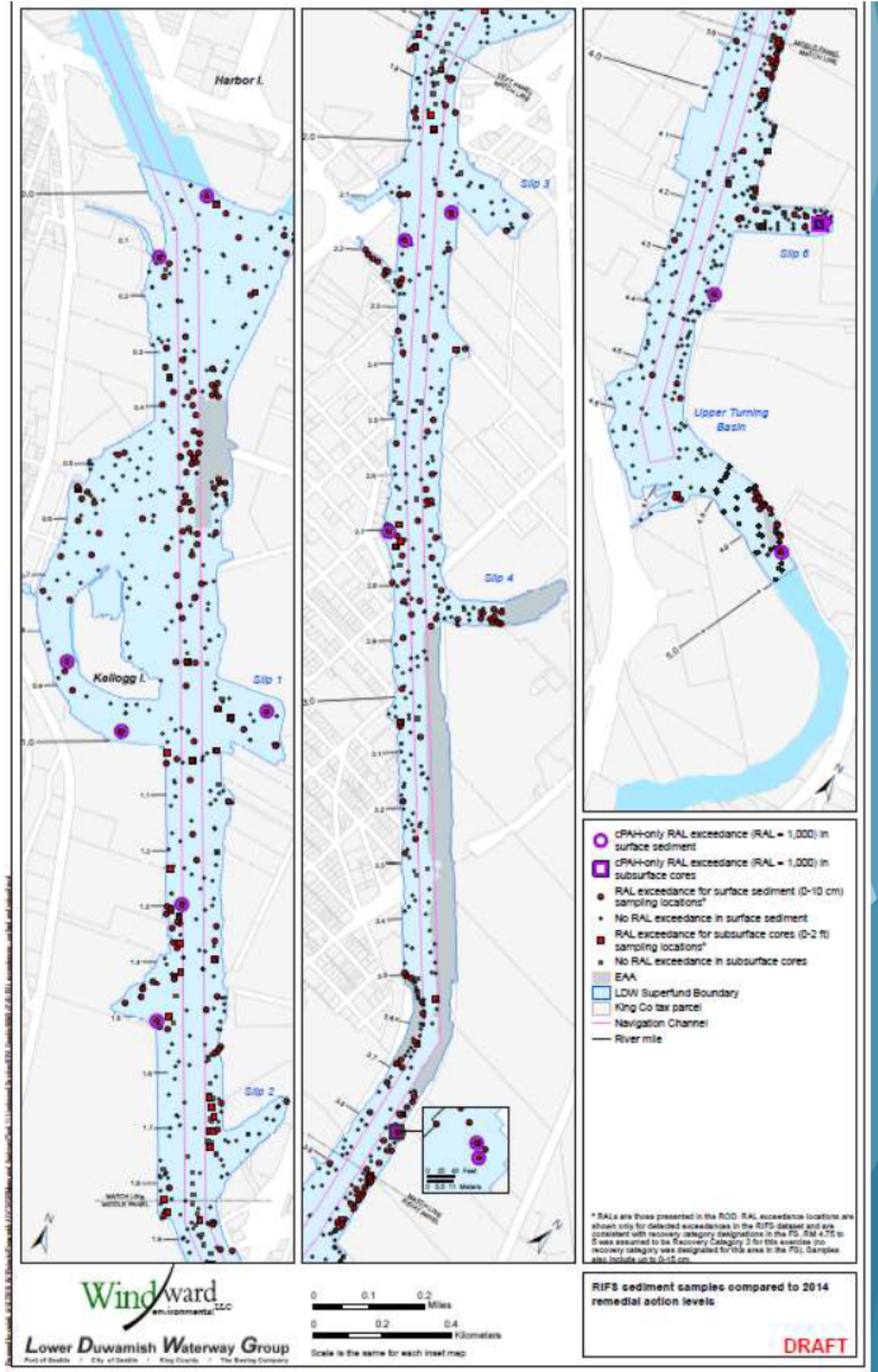
- IRIS established in 1985 to provide a database of human health assessments for chemicals
- IRIS periodically selects contaminants for review.
- IRIS review of 1984 value for benzo(a)pyrene initiated with interagency science consultation on draft in June 2011.
- After multiple rounds of public comment and peer review, assessment finalized January 2017.
- B(a)p is the keystone for cPAH TEQ risk estimation. Apply a factor (<1) to calculate cancer risk from other carcinogenic PAHs.

IRIS Toxicity Value for benzo(a)pyrene *(continued)*

- Other sites, including Portland Harbor, East Waterway, and Wyckoff/Eagle Harbor are incorporating the new information.
- IRIS report: benzo(a)pyrene is a less potent carcinogen than previously thought. Relative potency not changed, so overall cPAH risk is reduced. Same level of protection can be achieved at higher concentration.
- EPA is evaluating the implications of this for LDW cleanup.

RI/FS sample locations

(purple circles/squares show where ONLY cPAHs exceeded the current RAL)



Sampling Updates

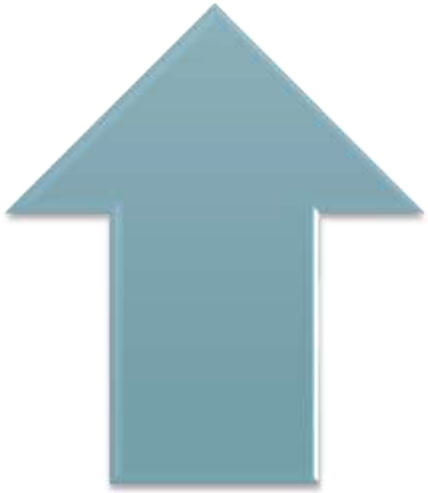
2019 Field Activities

- **Earle M. Jorgensen** – Sampling to assess the need for further cleanup at this site was delayed due to the January government shutdown and the extreme cold weather conditions encountered in February. Collection of sediment, backfill, and porewater was resumed in mid-March and has now been completed. The Data Summary Report is expected in June.
- **Terminal 117** – Year 3 monitoring/maintenance report from 2018 in review: results of upland storm drain solids sampling, stormwater, visual inspections, maintenance. Year 4 adds sediment; Sampling done in March 2019 at 4 locations in dredge/fill footprint, 5 perimeter locations.
- **Slip 4 EAA** – Year 7 monitoring/maintenance sampling early August
- **Boeing Plant 2** – October sediment sampling in EAA.
- **Carbon Amendment Pilot Study** – Year 2 monitoring this spring (more info below)
- **Bathymetric Survey of Upper Reach** – Performed in April for Remedial Design

Fishing Institutional Controls

Fish Consumption
Institutional Control Plan Update

Remedy Fish Consumption IC Goal- Behavior Change



Safer to eat: salmon

Consumption of resident seafood

- ICs are ***non-engineered instruments. . .*** that ***help to minimize the potential for exposure to contamination***. . .
- ICs are ***designed to work by. . .providing information that helps modify or guide human behavior at a site***. . .

- ***ICs should be carefully evaluated, selected, and narrowly tailored to meet the cleanup objectives for the site in a manner that does not unnecessarily restrict the reasonably anticipated future land use or resources.***

(***emphasis added***)

Fisher Study "take-aways" for developing Duwamish fish IC program

Non-English speakers more likely to target resident fish.

Relationships matter! ***Involving the impacted community is vital to success of health promotion strategies.***

Risk perception is based on experience & senses - not "Risk Assessor" concept of exposure and outcome.

Outreach needs to target those trusted sources of information specific to community

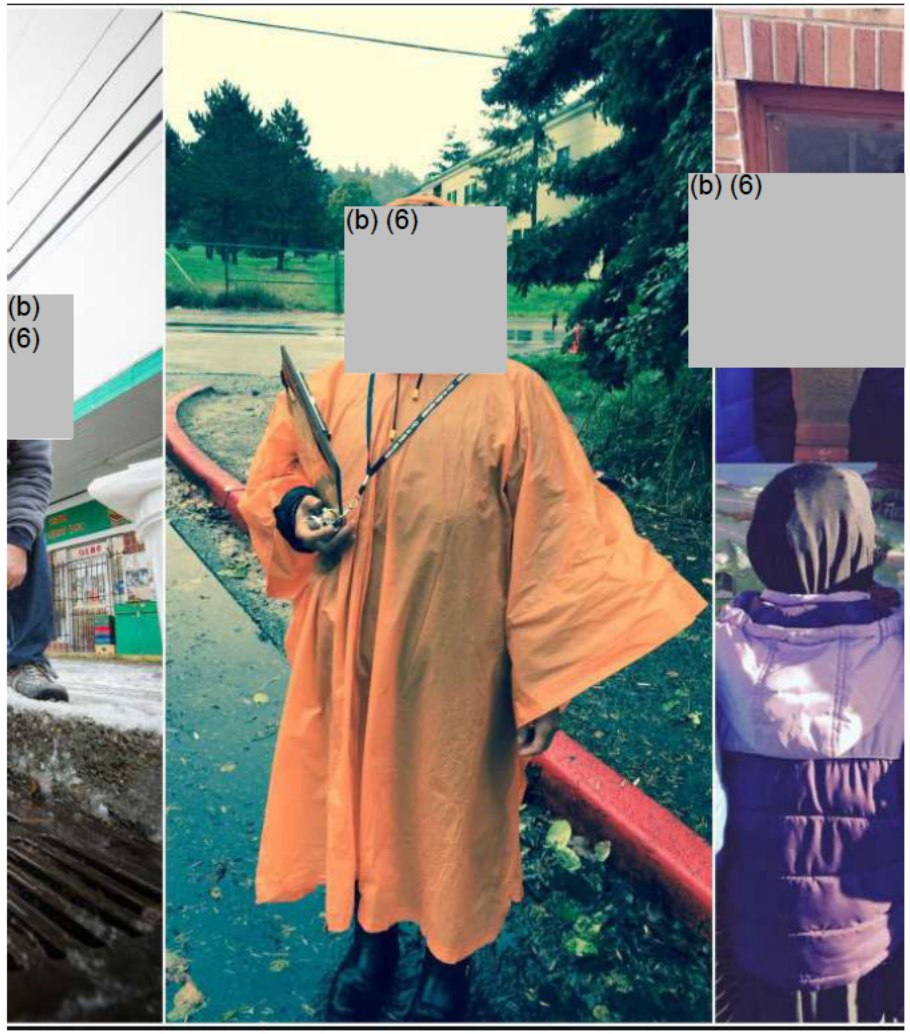
Emotional connection to the Duwamish; accessible and know fishing regs

Fishers tend to be male; preparers primarily females (target demo for health message).

Promoting ***healthy*** fish consumption behaviors

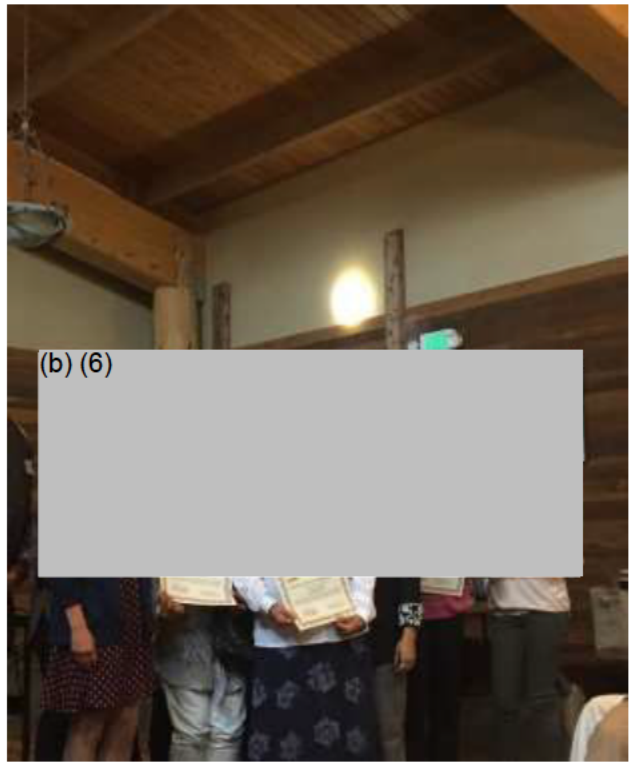
Safer to eat: salmon

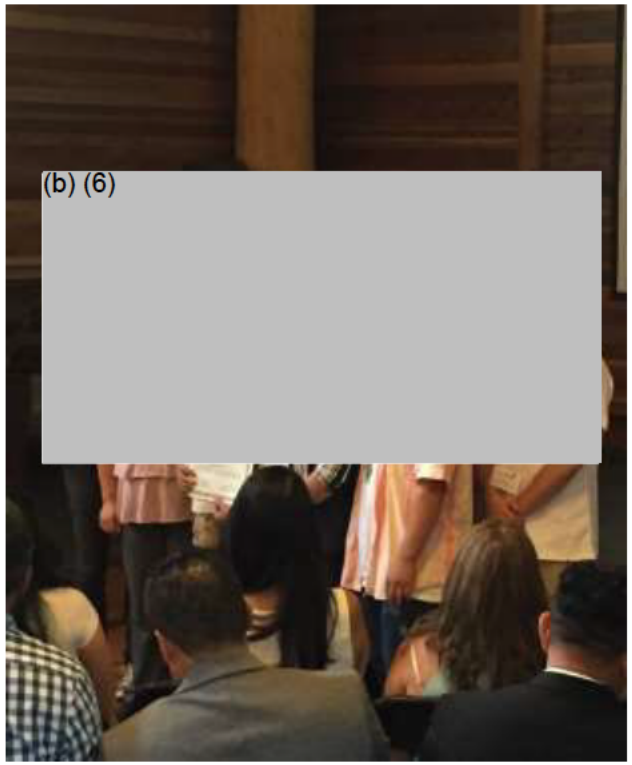
Consumption of resident seafood

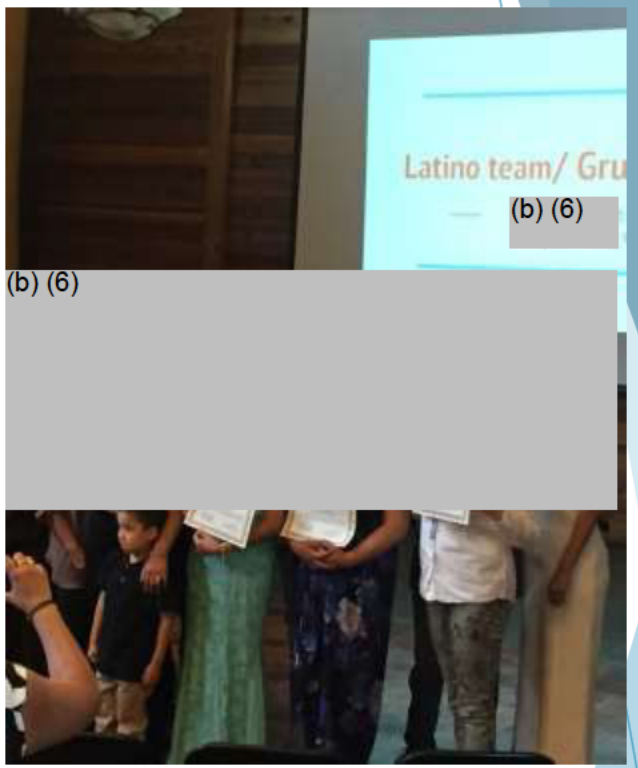


Developing Duwamish Fish ICs via Community Based Processes

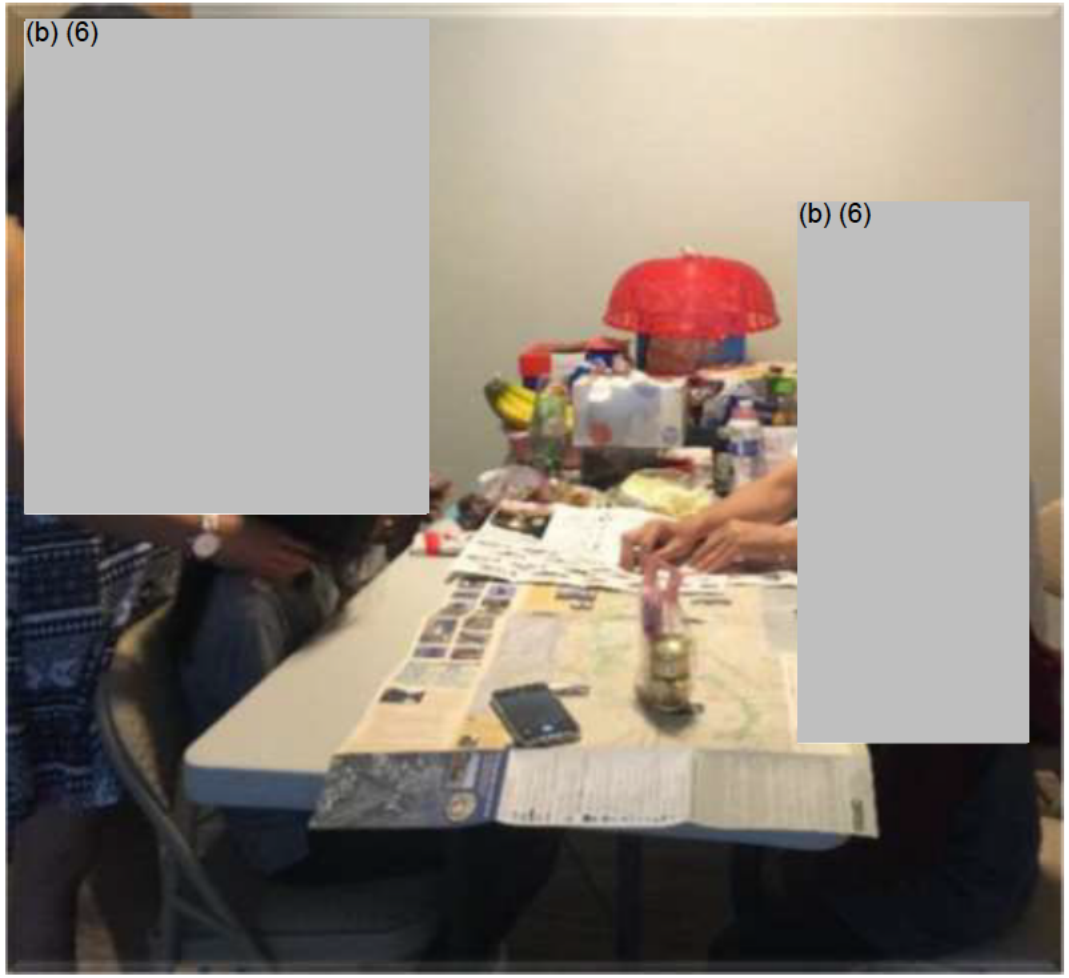
- Plan
- Build capacity
- Build tools
- Perform risk communication
- Evaluate

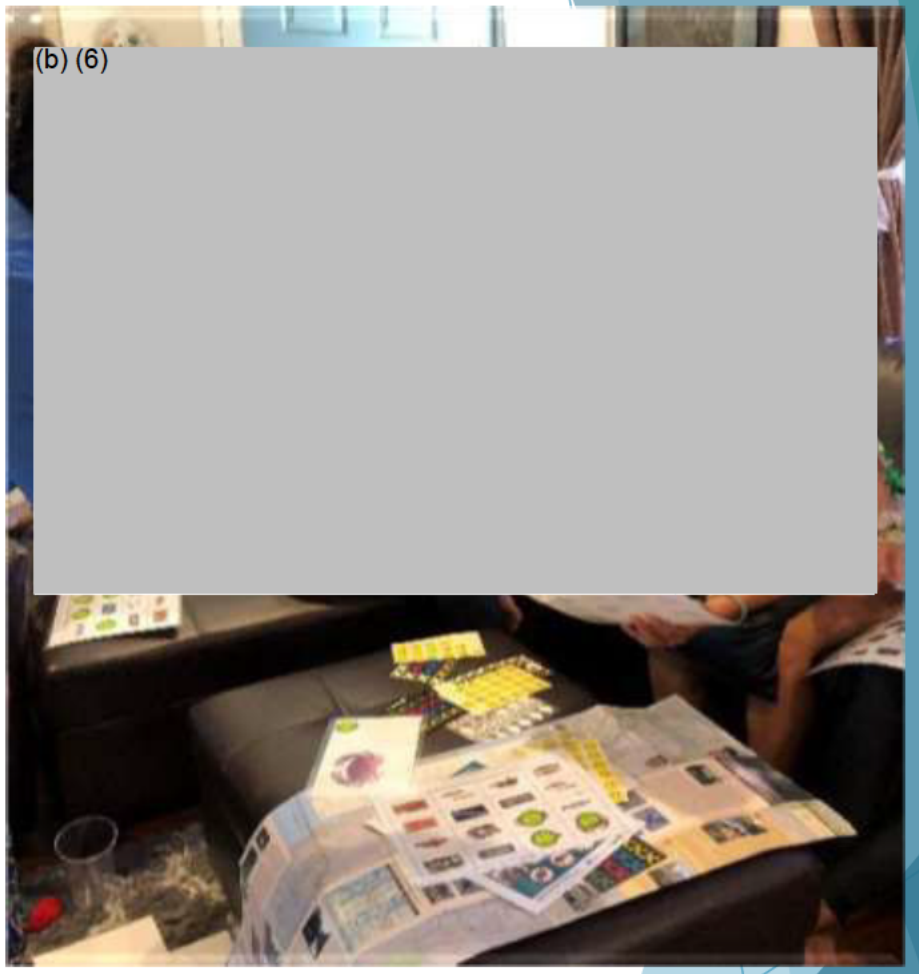






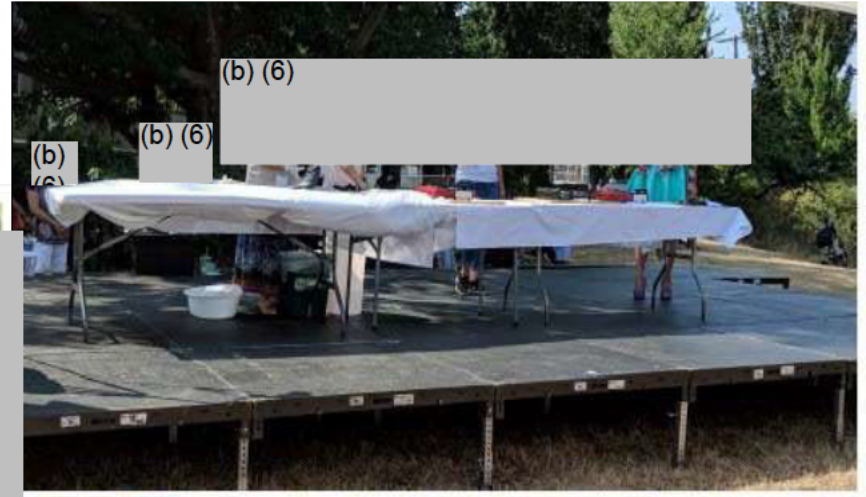
Capacity Building:
PHSKC Community Health Advocates

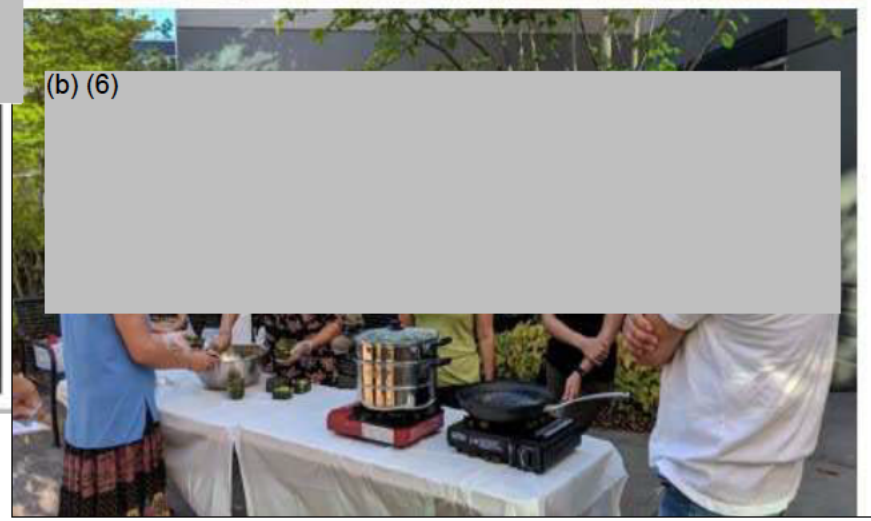




Tool: "Living Room" Outreach

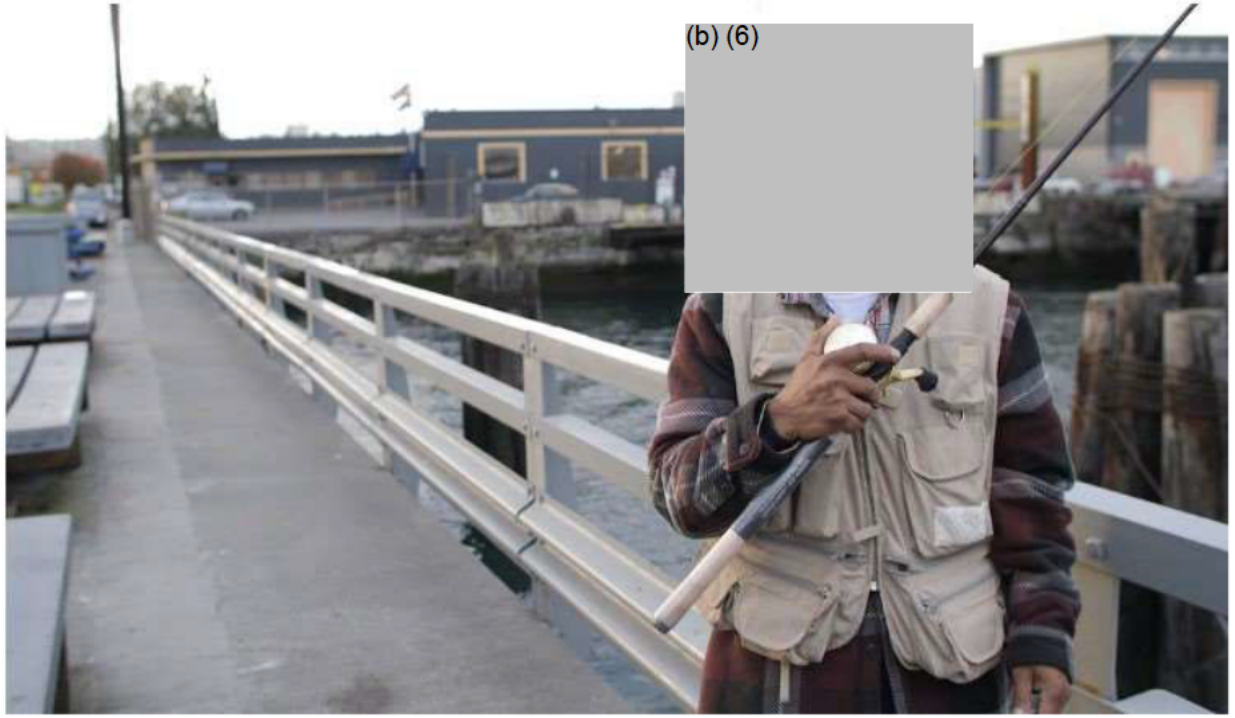
Tool: Salmon Recipe Cards





Khmer & Latino CHA's salmon cooking demonstration at ECOSS' Water Festival, a partnership event: 07/28/18

Tool: CHA Salmon Cooking Demo

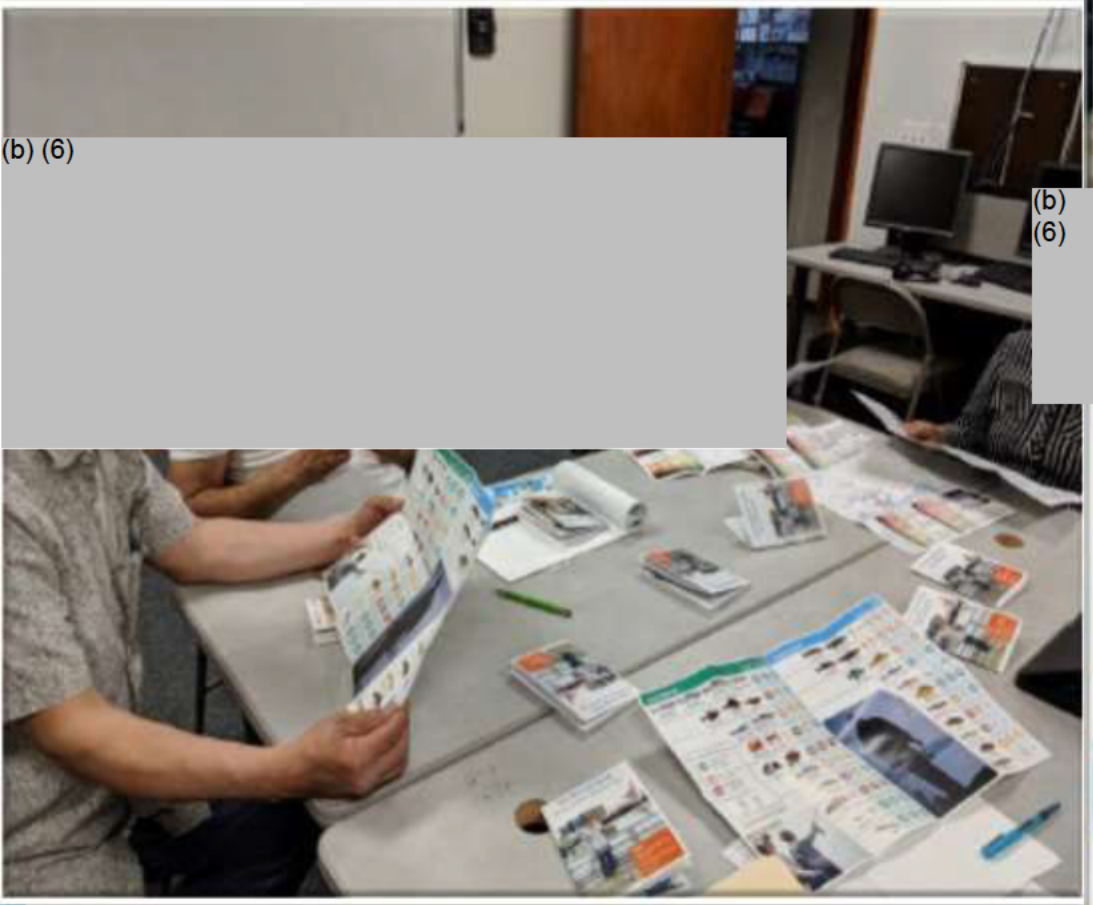


Sean—photo by revelritermedia.com

Cambodian fishers work to protect their community from contaminated

> *"We don't eat the fish we catch anymore, only the salmon," says Sean. "Instead, we educate people in the community about what fish are unsafe to eat."*

Tool: Media Outreach



Fisher Input: Redesign of Fishing Map

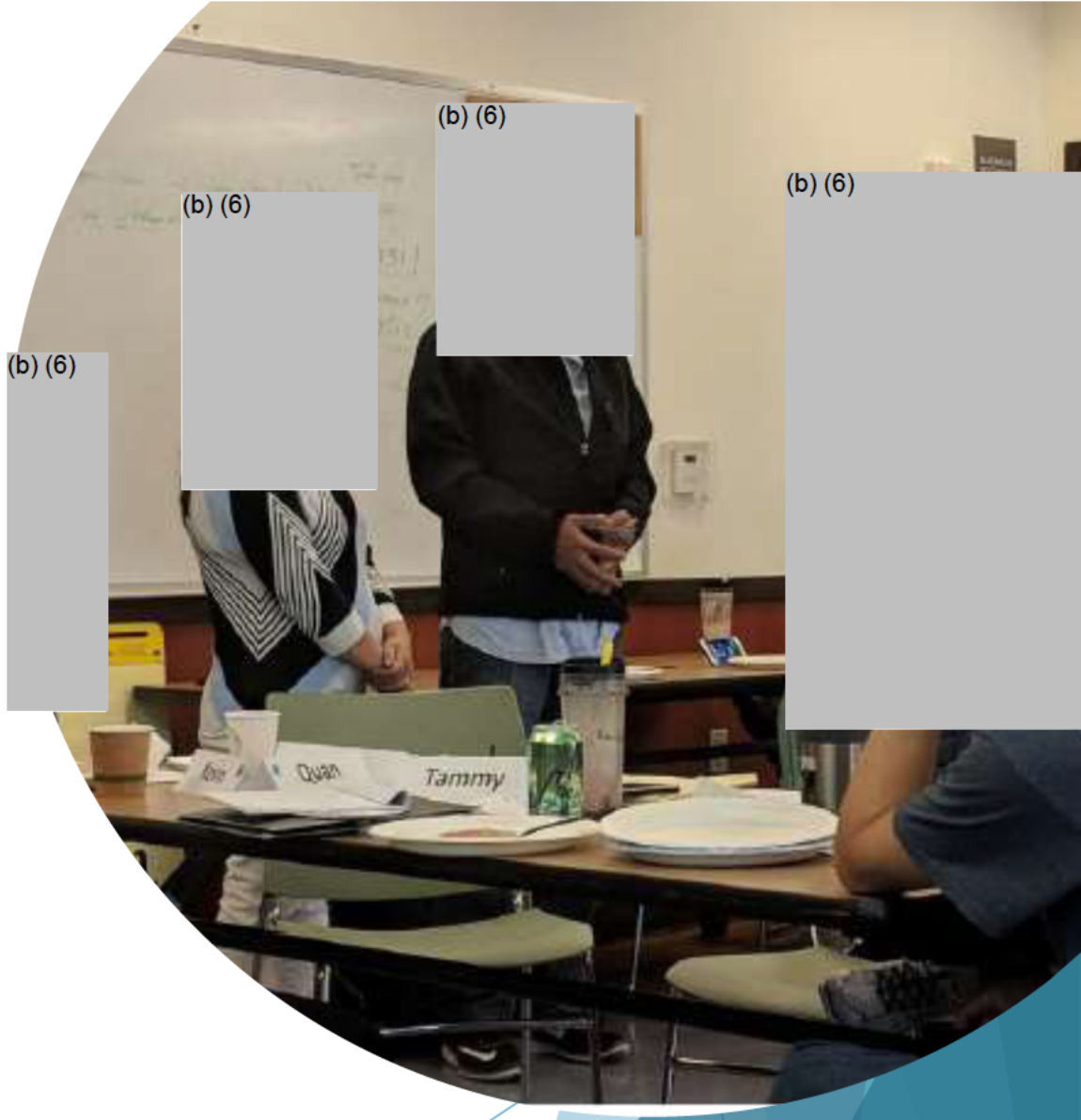
Tool: PHSKC Website

https://www.kingcounty.gov/duwamish-fishing

- Hosted by Public Health Seattle King County- multiple languages
- Features many of the tools described in this overview
- Digital Short Prepared By CHA:
  - https://youtu.be/JMp0oyu6ZaY

Next Steps on ICIAP Report and Timeline

- Fish IC Plan for Communicating Fish Advisory
  - Development: PHSKC meetings with Community Steering Committee June – December 2018
  - EPA and PHSKC discuss Draft Plan concepts – early 2019
  - Final Draft Plan- June 2019



Questions?

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Project Manager
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Updates on EPA Upland Sites

Terminal 108

Boeing Plant 2

Earle M. Jorgensen

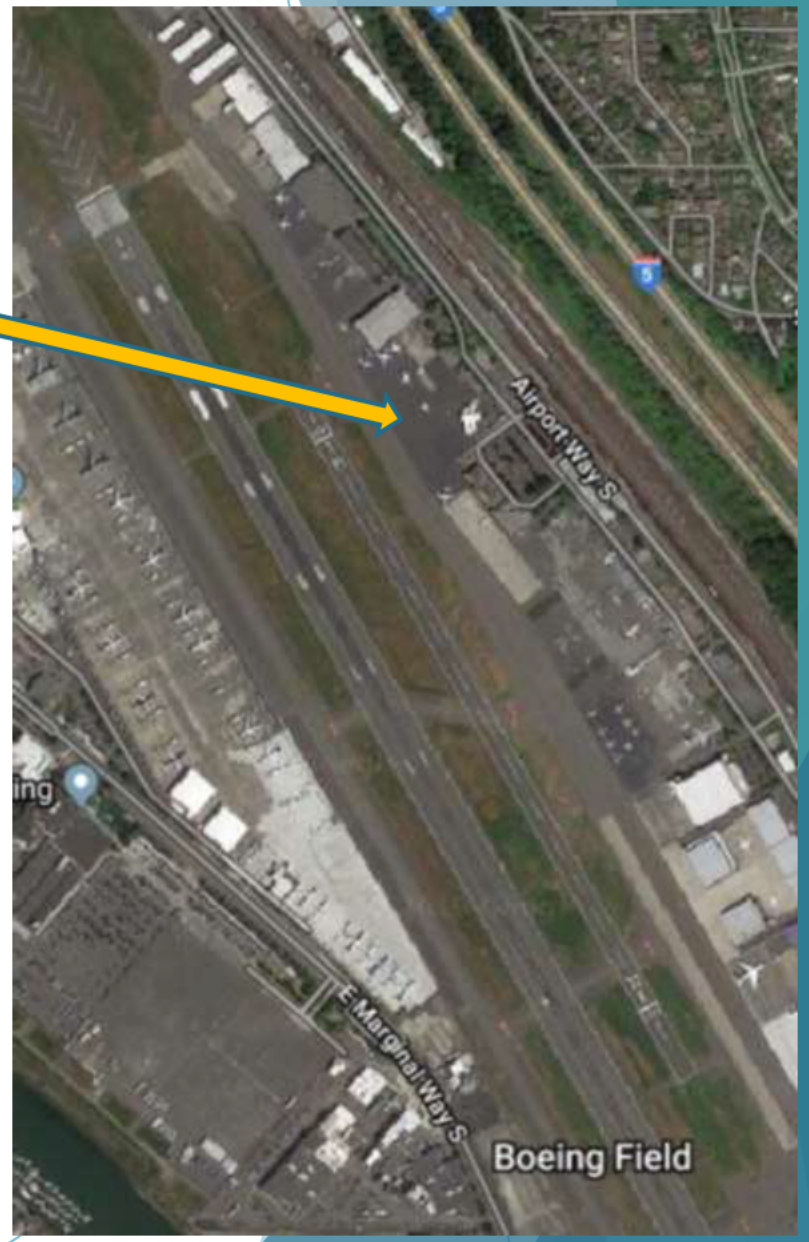
Rhone Poulenc

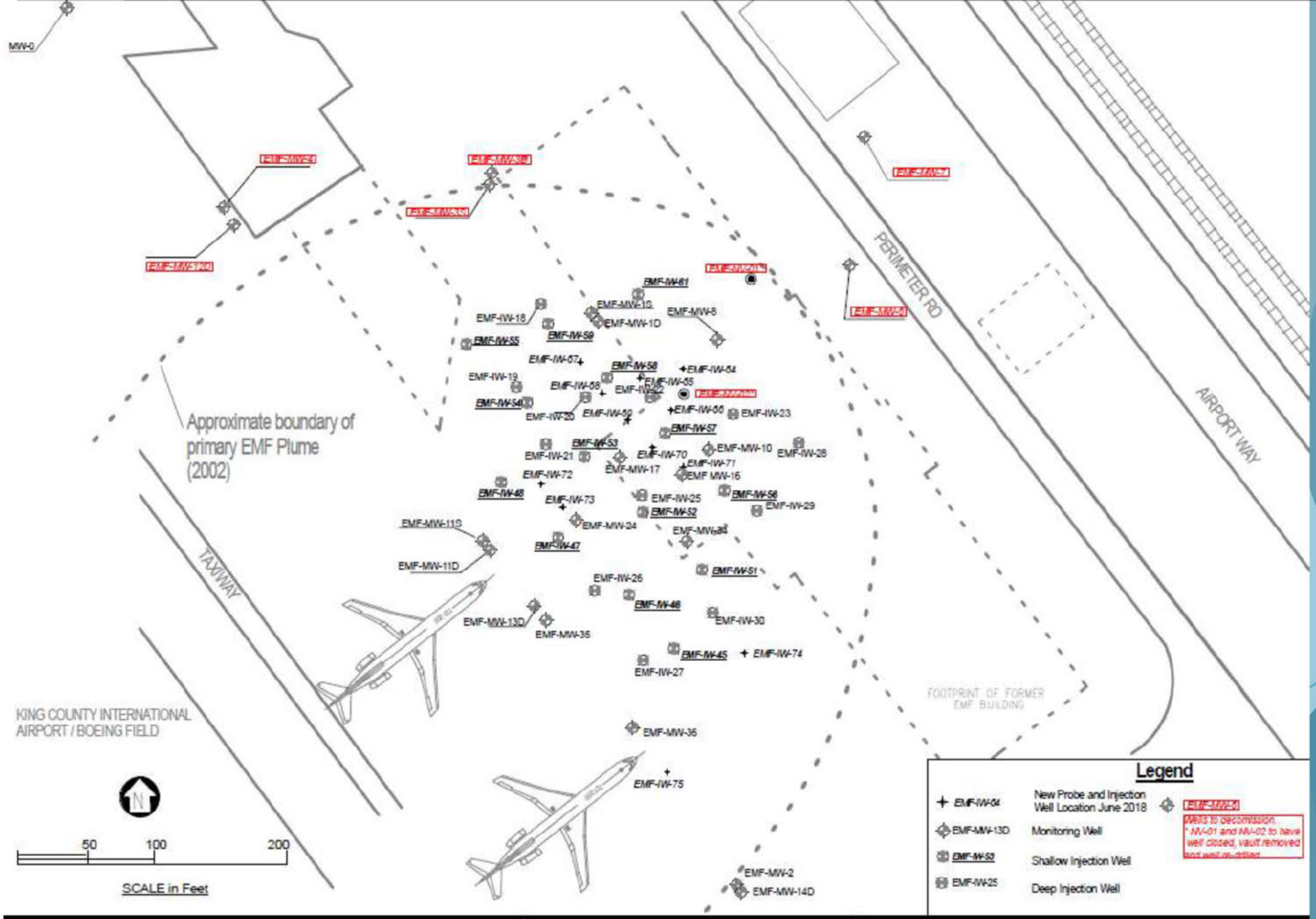
Boeing Electronics Manufacturing Facility

Planned projects near the EMF property: large aircraft parking project (LAPP)

Boeing plans to decommission multiple wells outside the current plume area that are no longer required for monitoring.

- However, two in-plume wells and their vaults must be dealt with in order for these projects to proceed.





BOEING • CALIBRE Systems Inc.

Location: EMF Site Seattle, WA

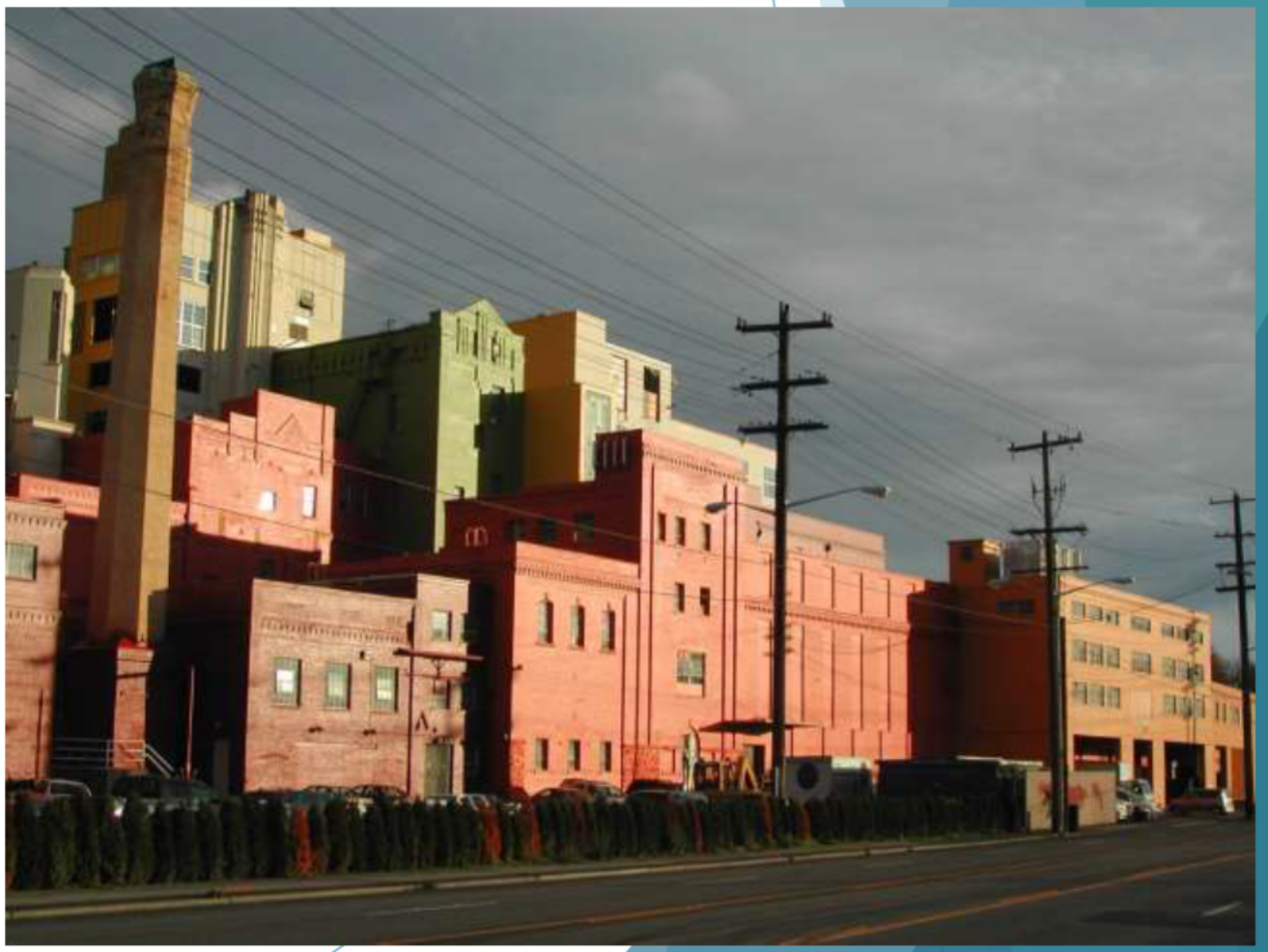
Figure 3 - Plan View of Well Locations to Decommission Former EMF Source Area

Former Rhone Poulenc

- RCRA site – East parcel is clean, owned by Museum of Flight, west parcel studies ongoing, slurry wall around groundwater plume in place
- Pilot test of CO_2 injection completed: successful at lowering pH.
- Expect to incorporate this technology into corrective measures study (CMS).
- Power affected about a week in April due to downed lines – hydraulic containment was maintained.

Rainier Commons (former Rainier Brewery)

- Ongoing paint removal to address PCBs on multiple surfaces
- Approval of plans for Phase 2b and Phase 3 work expected this summer, followed by completion of paint removal starting this fall.



Boeing Plant 2

- When the draft Statement of Basis is issued, public will have and opportunity for comment on the environmental covenants and the Pavement and Subsurface Materials Management Plan in addition to the Corrective Measures Study and Statement of Basis.

ACTIVATED CARBON-AMENDED ENHANCED NATURAL RECOVERY RESULTS FROM THE LOWER DUWAMISH WATERWAY

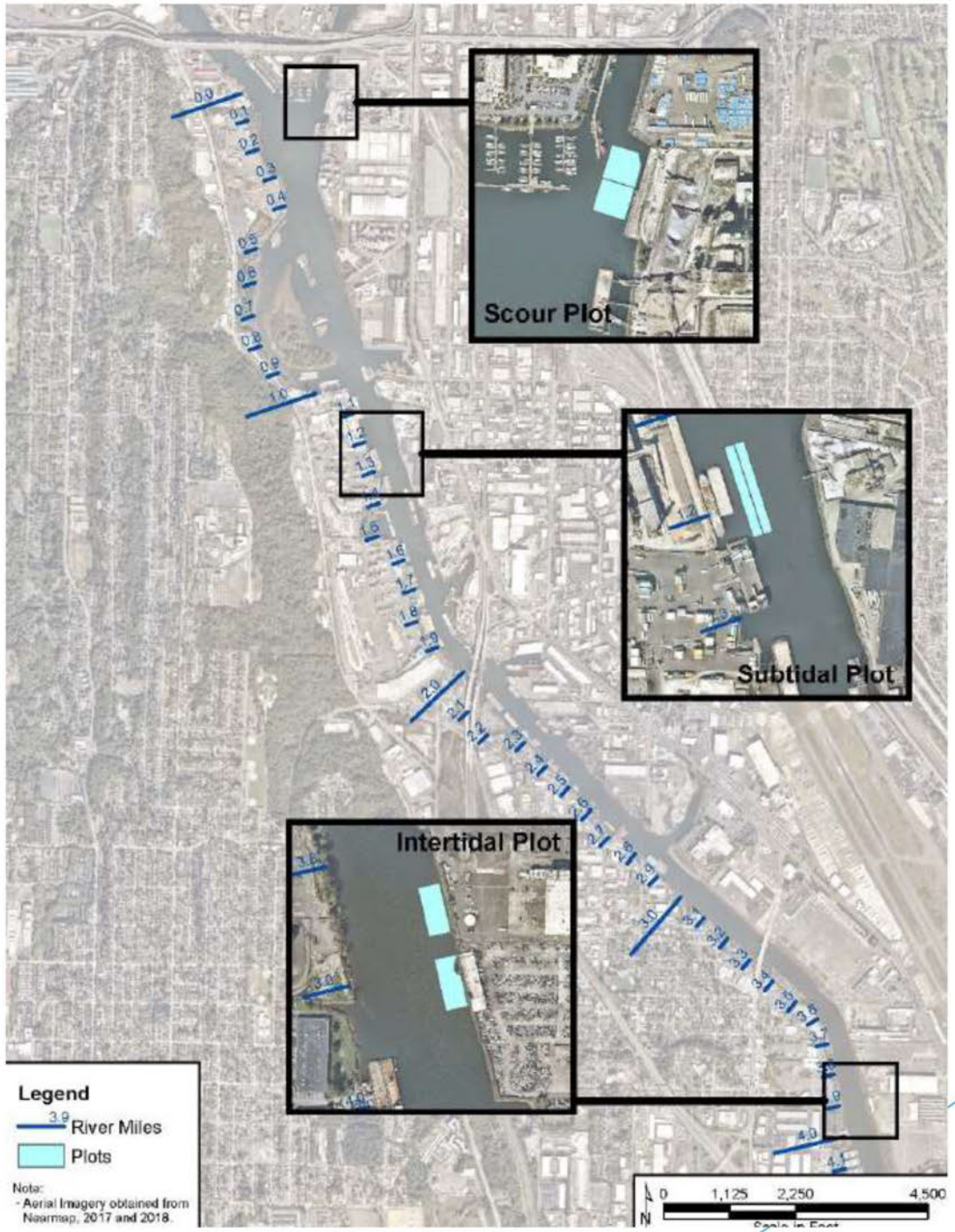
Kristen Kerns
Risk Assessor
USACE, Seattle, District

U.S.ARMY

US Army Corps of Engineers®

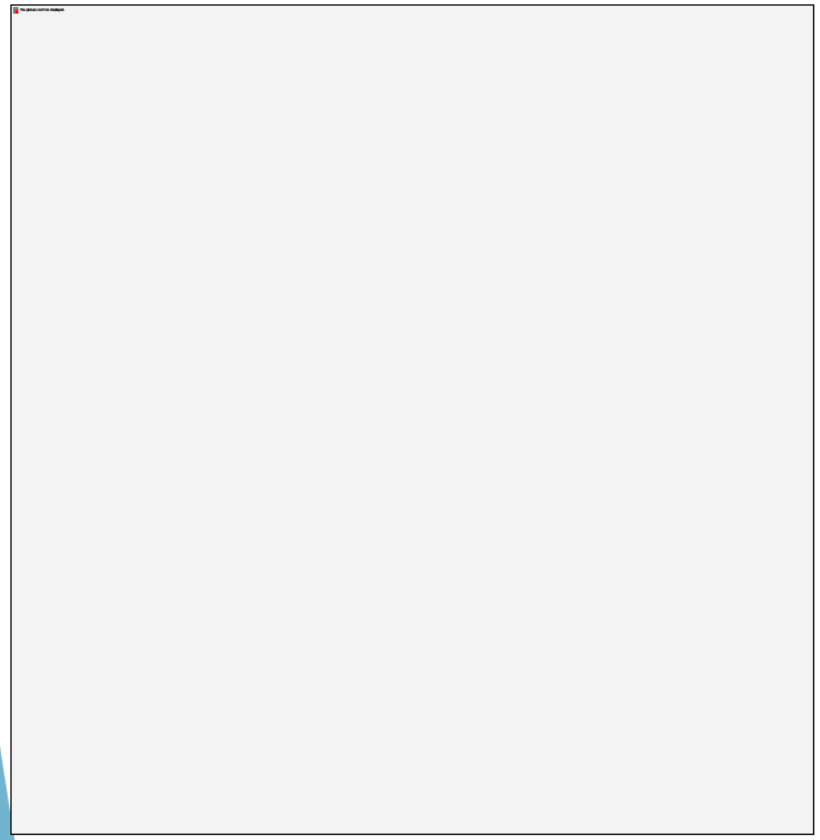
Pilot study objectives

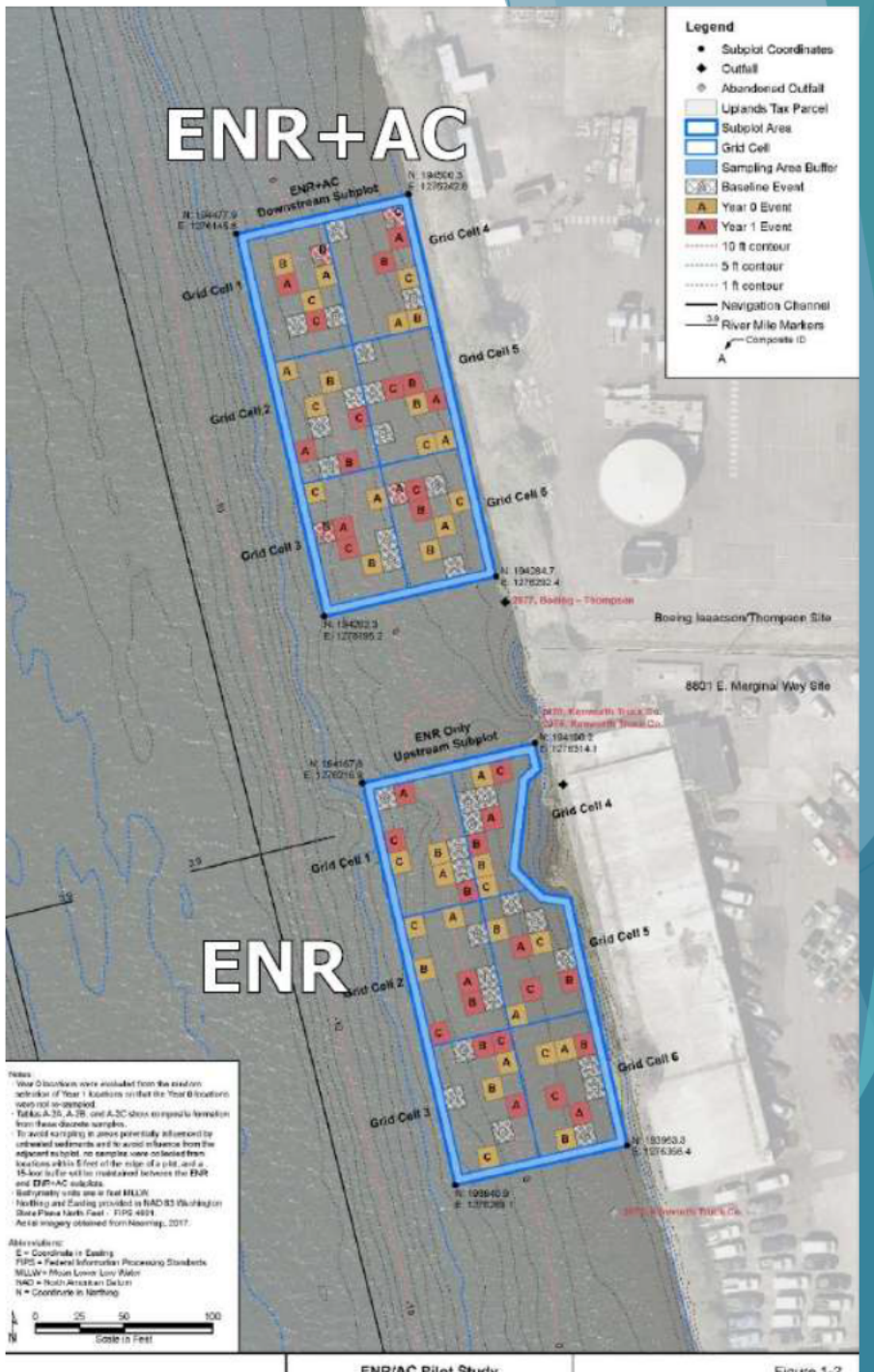
- Verify that ENR+AC can be successfully applied in the LDW by monitoring physical placement success (uniformity of coverage and percentage of carbon in a placed layer).
- Evaluate the performance of ENR+AC compared to ENR alone in locations with a range of PCB concentrations.
- Assess potential impacts on the benthic community in ENR+AC compared to ENR alone.
- Assess changes in bioavailability of PCBs in ENR+AC compared to ENR alone.
- Assess the stability of ENR+AC in scour areas (such as berthing areas).


Scour Plot
Subtidal Plot
Intertidal Plot
Legend
River Miles
Plots
Note:
- Aerial Imagery obtained from Nearmap, 2017 and 2018.
0
1,125
2,250
4,500
N

Intertidal plot

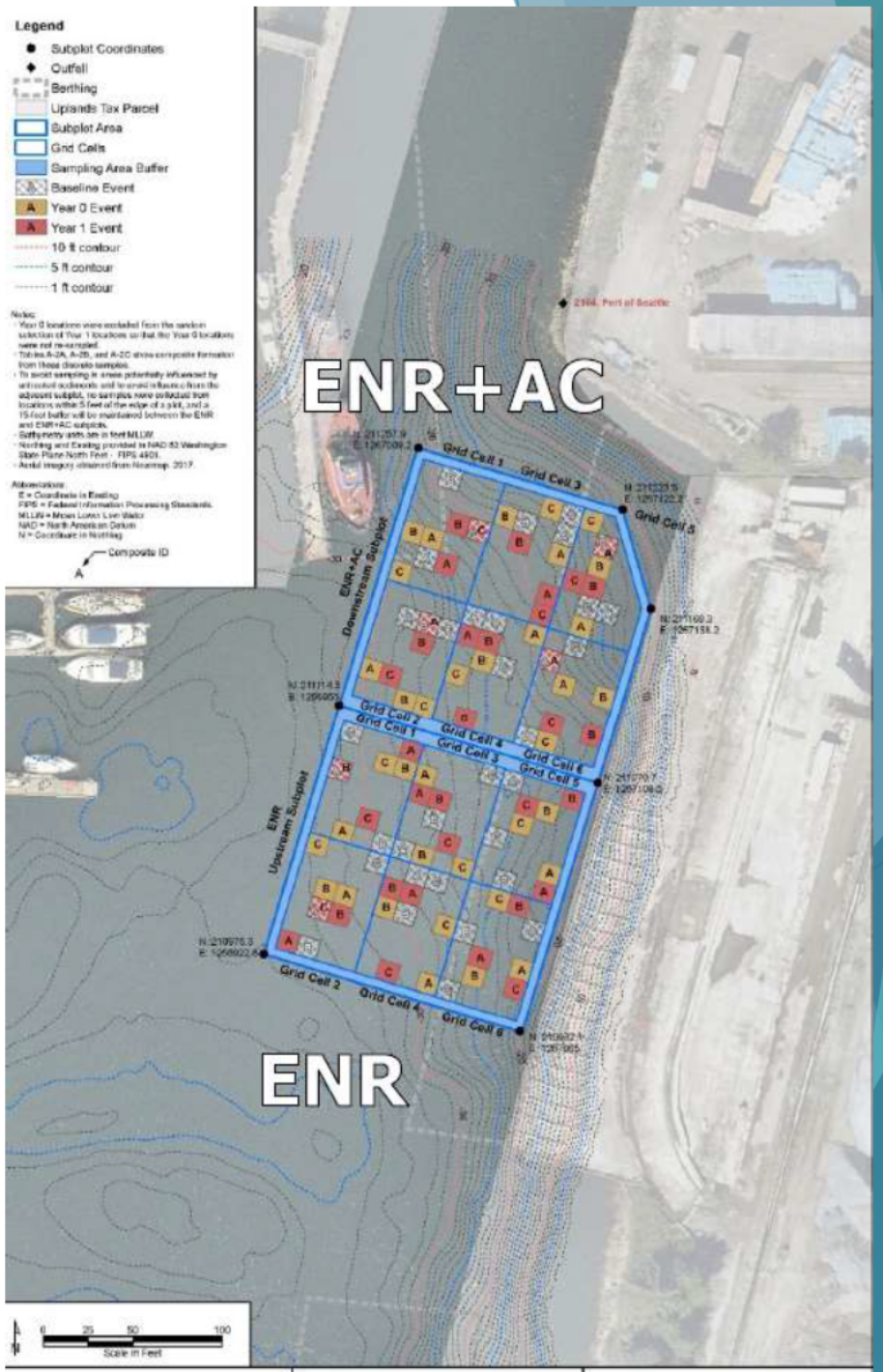
- ENR material consists of a gravel/sand substrate
- Baseline mean PCB bulk sediment concentrations of 196 and 221 µg/kg dw





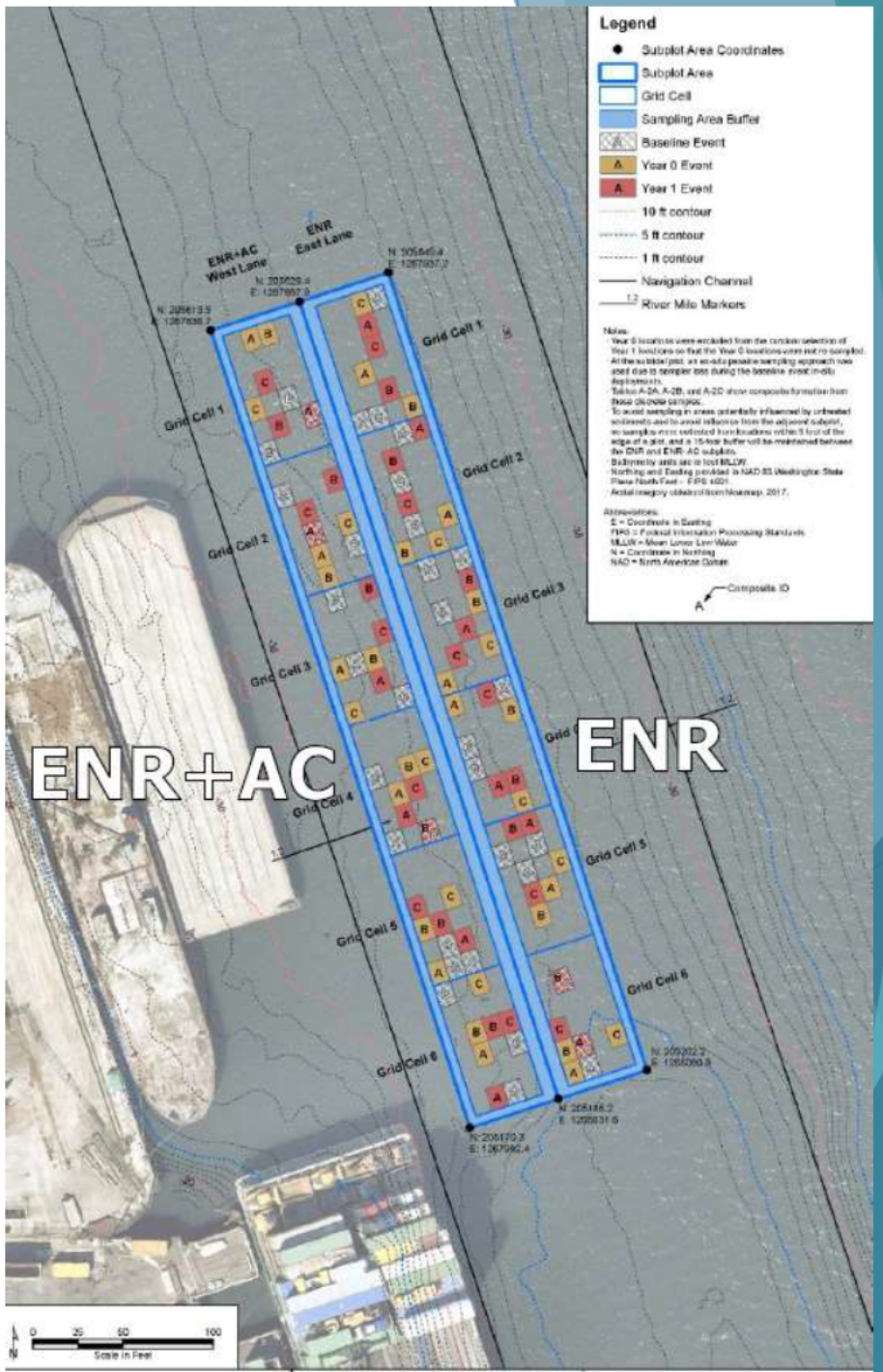
Scour plot

- ENR material consists of a gravel/sand substrate
- Baseline mean PCB bulk sediment concentrations of 29.4 and 22.6 µg/kg dw
- Initial assumption that area is subject to scour may not be accurate

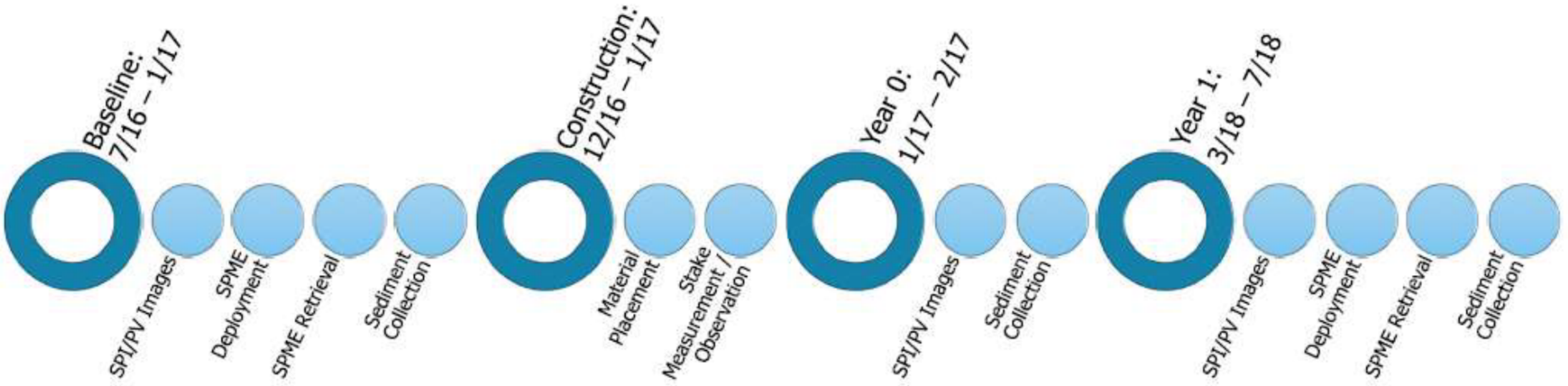


Subtidal plot

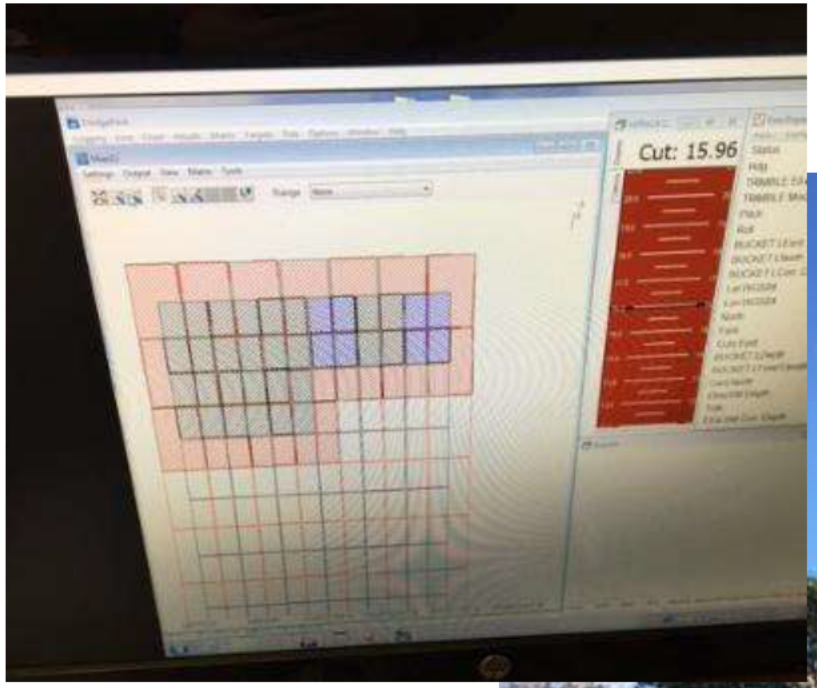
- ENR material consists of sand substrate
- Baseline mean PCB bulk sediment concentrations of 257 and 221 µg/kg dw
- Within navigation channel boundaries
- Monitoring has noted significant physical disturbance, possibly the result of barge tow bridle
- SPMEs performed ex-situ due to disturbance and initial loss of samplers during in-situ testing



PROJECT TIMELINE

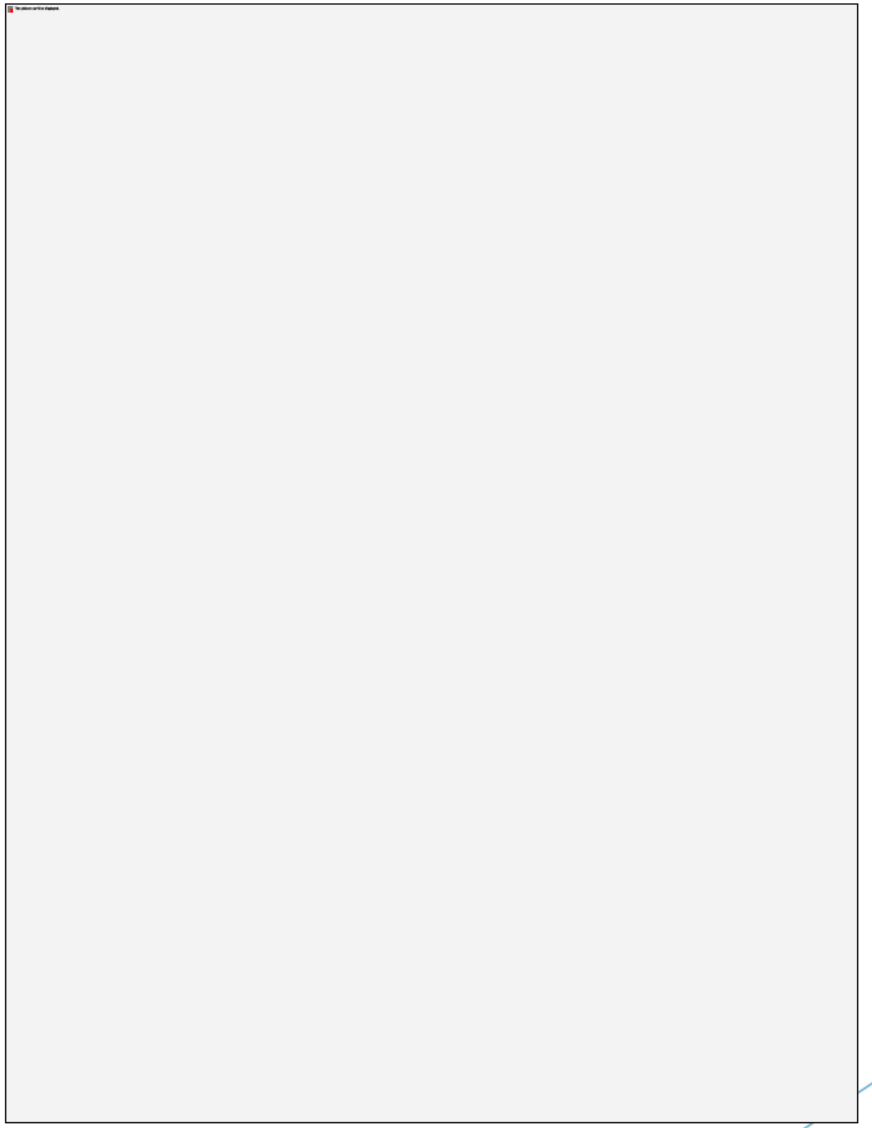


construction



Passive sampling with spme

- Measure C_{free} in porewater for PCBs
- Polydimethylsiloxane (PDMS)
- Performance Reference Compounds (PRCs) for PCBs
- Allowed to equilibrate for approximately 30 days in sediment

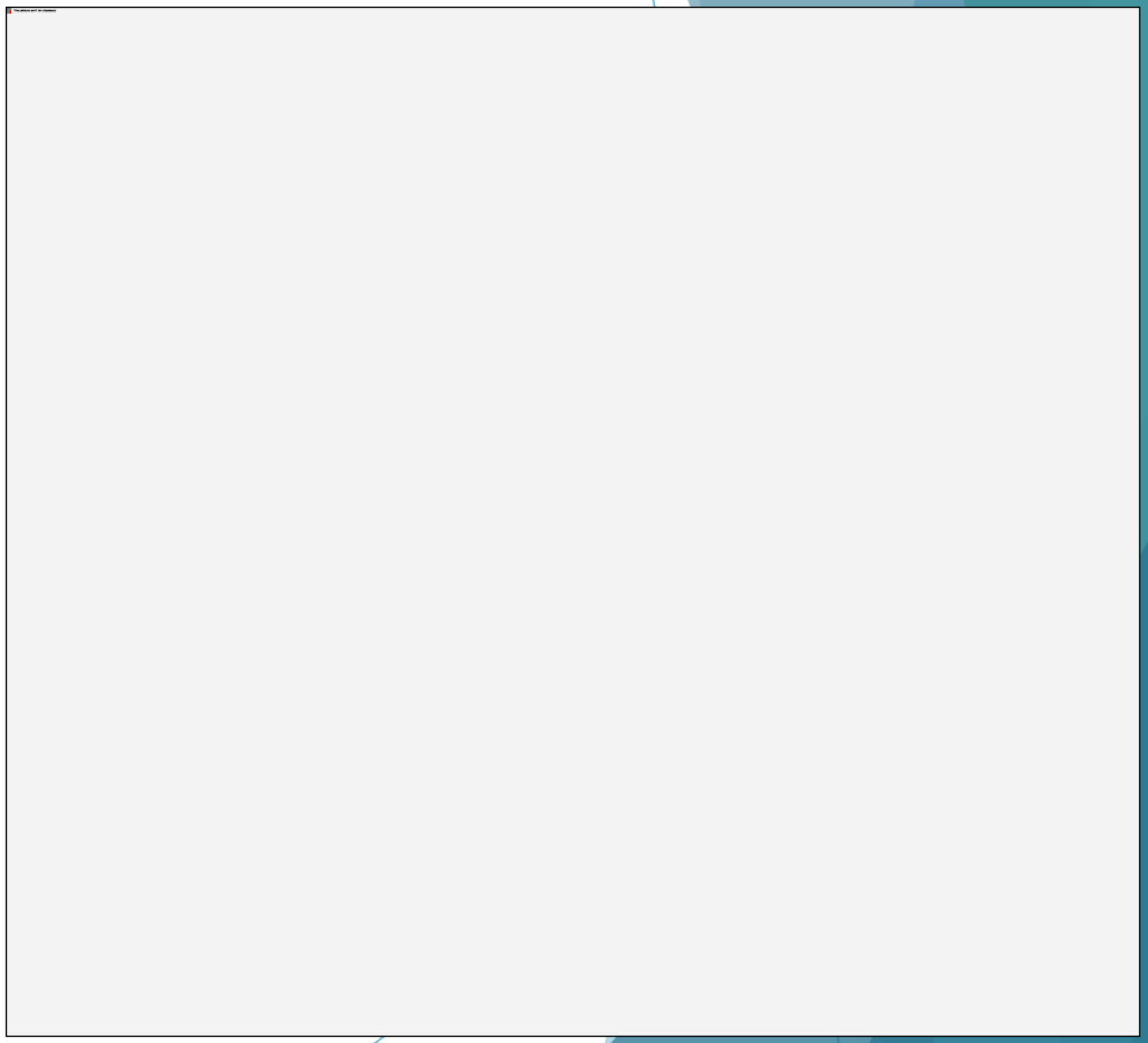


Sediment profile imaging

- SPI and plan view imagery collected at Baseline, Year 0, and Year 1

- Baseline
  - 3 replicate images from 12 station in each plot (6 stations per subplot)

- Year 0 and Year 1
  - 3 replicate images from 24 stations in each plot (12 per subplot)



Sediment profile imaging

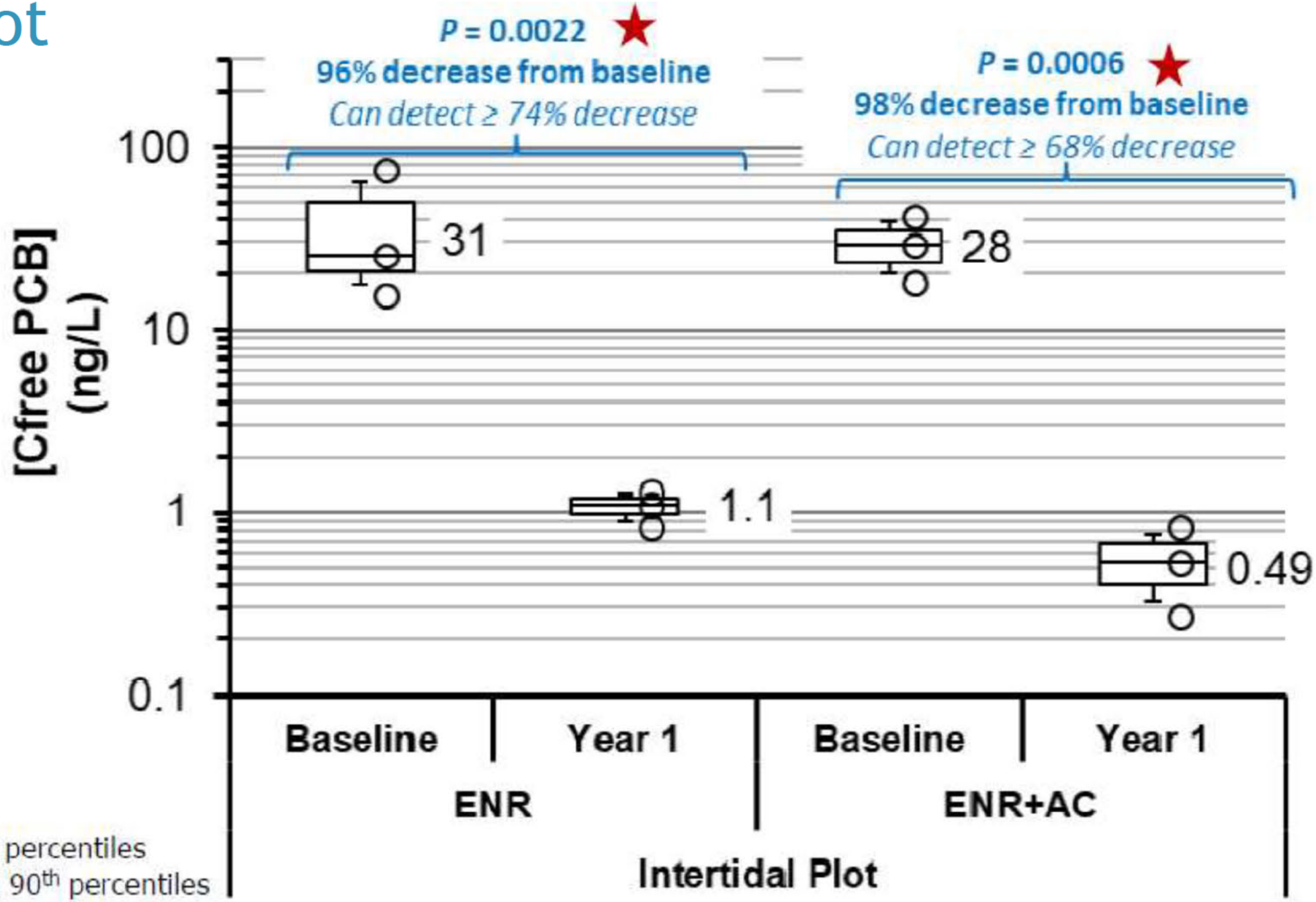
Pre-construction

Post-construction

Year 1 Monitoring

results

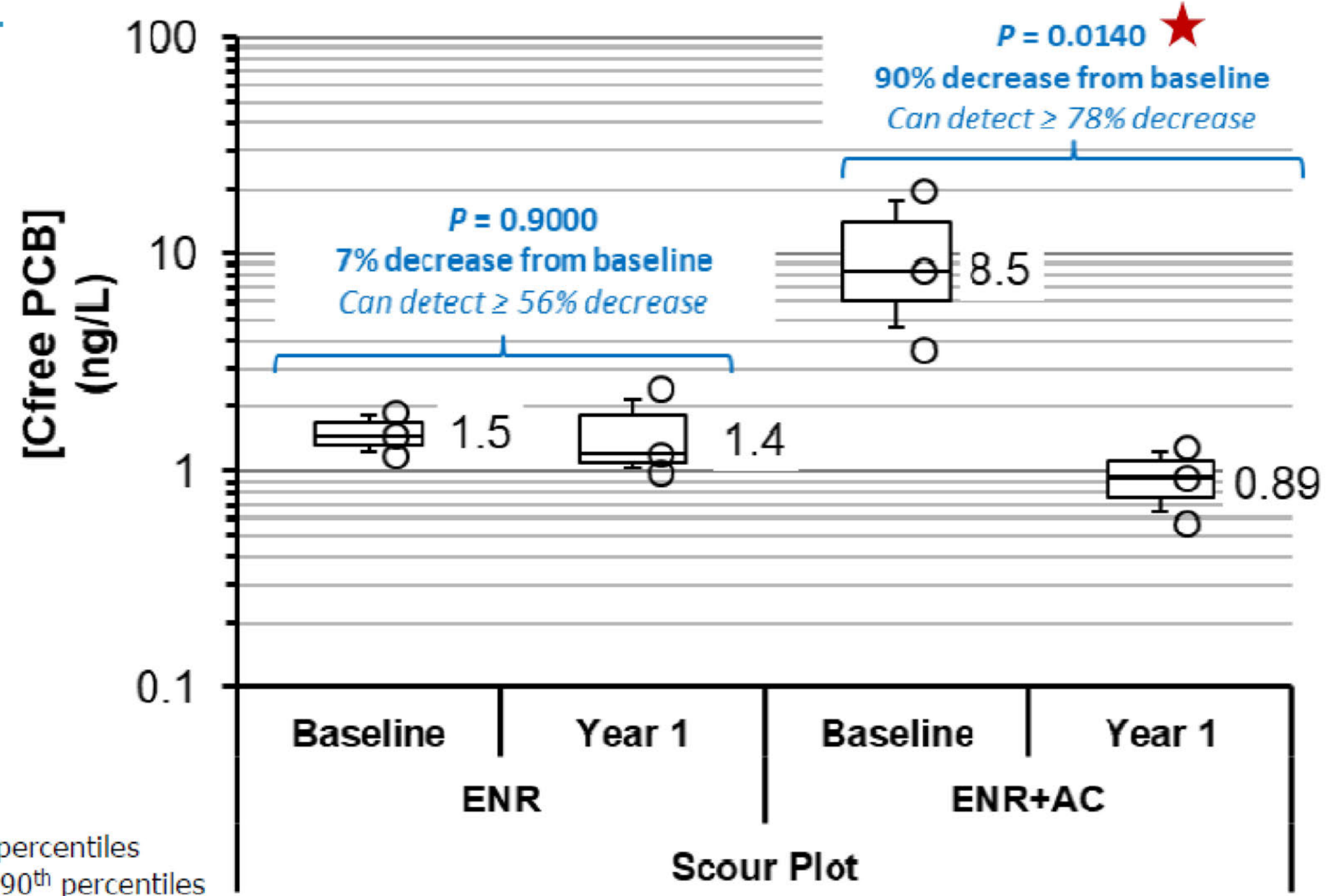
Intertidal Plot Porewater



Key
Circles – Raw data
Boxes – 25th to 75th percentiles
Whiskers – 10th and 90th percentiles
Values – Geometric means

Source: Wood, Dalton-Olmsted-Fuglevand, Ramboll, Floyd I Snider, Geosyntec, Integral

Scour PLOT Porewater



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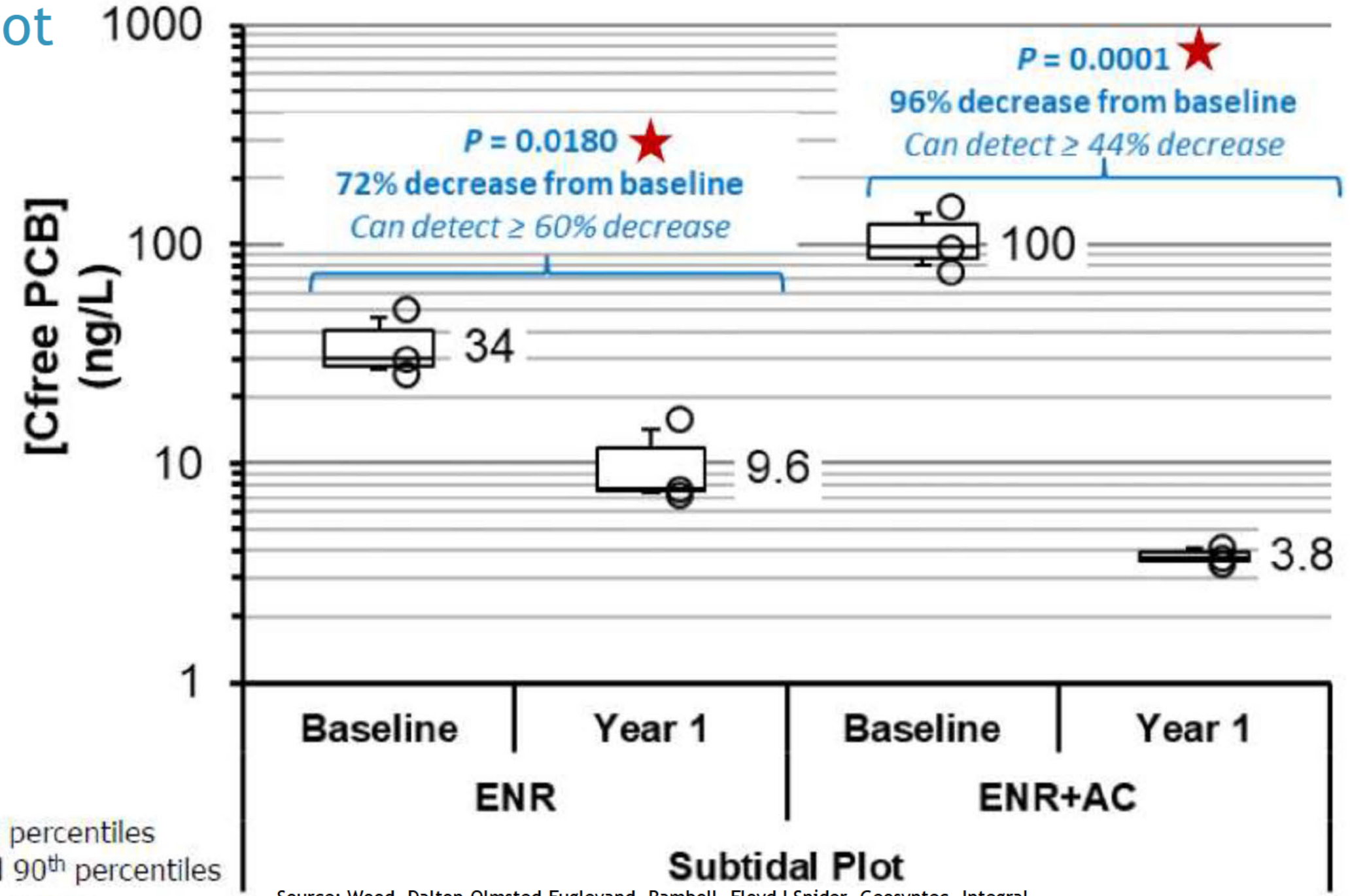
Subtidal Plot Porewater



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Values – Geometric means

Source: Wood, Dalton-Olmsted-Fuglevand, Ramboll, Floyd I Snider, Geosyntec, Integral

Next Steps

- **Year 2 Monitoring (2019)**
  - SPI
  - Bulk sediment
  - Porewater
- **Year 3 Monitoring (2020)**
  - SPI
  - Bulk sediment
  - Porewater
  - Benthic Survey
  - Bioassay
- **Outcome**
  - Consideration for inclusion of AC in ENR for the LDW Superfund Remedy

Ecology Updates

Nearby EPA Sites

Lockheed West Seattle,

Harbor Island,

East Waterway,

Pacific Sound Resources (PSR)

DRCC/TAG Updates

Next Stakeholders Meeting:

November 13, 2019